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APPLICANT: ADANG, MICHAEL J. ; KEMP, JOHN D.

REEL: 4986 FRAME: 0934 DATE RECORDED: 12/19/88 NUMBER OF PAGES: 002

ASSIGNOR: ADANG, MICHAEL J.

EXC DATE: 10/24/88

ASSIGNEE: LUBRIZOL GENETICS, INC., 29400 LAKELAND BLVD., WICKLIFFE, OH
44092, A CORP. OF NV

BRIEF:

ASSIGNMENT OF ASSIGNORS INTEREST
RETURN ADDRESS: ELLEN P. WINNER

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REEL: 4986 FRAME: 0932 DATE RECORDED: 12/19/88 NUMBER OF PAGES: 002

ASSIGNOR: KEMP, JOHN D.

EXC DATE: 11/09/88

ASSIGNEE: LUBRIZOL GENETICS, INC., 29400 LAKELAND BLVD., WICKLIFFE, OH
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NO MORE INFORMATION FOR THIS SERIAL NUMBER

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FILE: 4986 FRAME: 0932 MAILROOM DT: 12/19/88 NEW APP FIL RCPT DT: 00/00/00
CONTROL NO: DT: 00/00/00 REC KEY DATE: 00/00/00 DT MAILED: 00/00/00
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WARNING - FIELD CODE NOT VALID 'CLMS'

6215 BACILLUS

361 THURINGIENSIS

319 BACILLUS THURINGIENSIS

(BACILLUS(W)THURINGIENSIS)

0 PLANT#/CLMS

L1 0 BACILLUS THURINGIENSIS AND PLANT#/CLMS

=> s bacillus thuringiensis

6215 BACILLUS

361 THURINGIENSIS

L2 319 BACILLUS THURINGIENSIS

(BACILLUS(W)THURINGIENSIS)

=> s 12 and plant#/clm

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P0003

16278 PLANT#/CLM

L3 106 L2 AND PLANT#/CLM

=> s 13 and 435/clas

23532 435/CLAS

L4 31 L3 AND 435/CLAS

=> d 1-31

1. 5,126,133, Jun. 30, 1992, *Bacillus thuringiensis* isolate active against lepidopteran pests, and genes encoding novel lepidopteran-active toxins; Jewel Payne, et al., 424/93L, 93A; 435/69.1, 71.2, 91, 170, 172.1, 172.3, 252.3, 252.5, 320.1, 832; 536/27; 935/6, 9, 22, 59, 60, 61, 64 [IMAGE AVAILABLE]

2. 5,120,536, Jun. 9, 1992, *Bacillus thuringiensis* var. *donegani* prepate or toxin obtained from it, endowed with insecticide activity against Coleoptera; Dante Cigaria, et al., 424/93L; 435/252.1, 252.3, 252.5, 832; 530/350 [IMAGE AVAILABLE]

3. 5,093,120, Mar. 3, 1992, Novel isolates of *Bacillus thuringiensis* having activity against nematodes; David L. Edwards, et al., 424/93L; 435/172.3, 252.5, 317.1, 832; 514/2; 800/205; 935/63, 64 [IMAGE AVAILABLE]

4. 5,087,558, Feb. 11, 1992, Method for identifying and characterizing organisms; John A. Webster, Jr., 435/5, 4, 6, 34, 810; 436/804; 536/27; 935/78 [IMAGE AVAILABLE]

5. 5,085,588, Feb. 4, 1992, Bacterial promoters inducible by plant extracts; Sharon R. Long, et al., 435/69.1, 71.2, 172.3, 252.2, 12:37:18 COPY AND CLEAR PAGE, PLEASE

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P0004

252.3, 320.1, 878; 536/27; 800/205; 935/35, 36, 41, 43, 67, 72

[IMAGE AVAILABLE]

6. 5,152,055, Nov. 5, 1991, Preparation of strains of *Bacillus thuringiensis* having an improved activity against certain lepidopterous pests and novel strain produced thereby; Denis H. Burges, et al., 424/93R; 435/69.1, 71.1, 172.1, 172.3, 252.5, 320.1, 832; 536/27; 935/55, 59, 64, 66, 74 [IMAGE AVAILABLE]

7. 5,051,489, Oct. 29, 1991, Insecticidal *Bacillus thuringiensis*

strains with activity against lepidoptera; Roger L. Bernier, et al.,
424/93L; 435/71.3, 252.8, 832 [IMAGE AVAILABLE]

8. 5,048,460, Sep. 3, 1991, DNA sequence encoding
metallocarboxypeptidase inhibitor protein; Belinda M. Martineau, et al.,
435/172.3, 317.1; 536/27; 935/30, 67 [IMAGE AVAILABLE]

9. 5,037,523, Aug. 13, 1991, Novel *Bacillus thuringiensis* isolate
denoted B.t. PS81F, active against lepidopteran pests, and a gene
encoding a lepidopteran-active toxin; Jewel Payne, et al., 424/93L;
435/69.1, 71.1, 71.3, 91, 170, 172.1, 172.3, 240.1,
252.3, 320.1, 832, 848, 874; 536/27; 935/6, 9, 22, 59, 66, 72,
73 [IMAGE AVAILABLE]

10. 5,017,373, May 21, 1991, Cloning and expression of *bacillus*
thuringiensis gene toxic to beetles of the order coleoptera; Corinna
Herrnstadt, et al., 424/93A; 435/69.1, 71.2, 91, 170, 172.1,
172.3, 252.34, 320.1, 876; 536/27; 935/6, 9, 22, 29, 59, 60, 64,
66, 72 [IMAGE AVAILABLE]

11. 5,015,580, May 14, 1991, Particle-mediated transformation of soybean
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05 AUG 92 12:38:26 U.S. Patent & Trademark Office P0005
plants and lines; Paul Christou, et al., 435/172.3, 172.1, 240.45,
240.47, 240.48, 240.5, 317.1, 320.1; 800/205, DIG.26; 935/30,
52, 53, 67, 85 [IMAGE AVAILABLE]

12. 5,008,194, Apr. 16, 1991, *nifH* promoters of *Bradyrhizobium*; Barry G.
Rolfe, et al., 435/172.3, 252.2, 252.3, 320.1; 536/27; 935/6, 35,
41 [IMAGE AVAILABLE]

13. 5,006,336, Apr. 9, 1991, Novel coleopteran-active *bacillus*
thuringiensis isolate; Jewel Payne, 424/93L; 435/252.5, 822;
530/350 [IMAGE AVAILABLE]

14. 5,004,863, Apr. 2, 1991, Genetic engineering of cotton plants and
lines; Paul F. Umbeck, 800/205; 435/172.3; 800/200, 255, DIG.27,
DIG.63; 935/67 [IMAGE AVAILABLE]

15. 5,002,765, Mar. 26, 1991, Cloning and expression of *bacillus*
thuringiensis gene toxic to beetles of the order coleoptera; Corinna
Herrnstadt, et al., 424/93A; 435/69.1, 71.2, 91, 170, 172.1,
172.3, 252.3, 252.33, 252.34; 536/27; 935/6, 9, 22, 29, 59, 60,
61, 66, 72, 73 [IMAGE AVAILABLE]

16. 5,001,061, Mar. 19, 1991, *nifD* promoter of *Bradyrhizobium*; Barry G.
Rolfe, et al., 435/172.3, 252.2, 252.3, 320.1; 536/27; 935/6, 35,
41 [IMAGE AVAILABLE]

17. 4,999,192, Mar. 12, 1991, Novel coleopteran-active *bacillus*
thuringiensis isolate; Jewel Payne, et al., 424/93L, 195.1, DIG.8;
435/252.5, 832; 530/350 [IMAGE AVAILABLE]

18. 4,990,332, Feb. 5, 1991, Novel lepidopteran-active *Bacillus*
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thuringiensis isolate; Jewel Payne, et al., 424/93L, 84; 435/252.5
[IMAGE AVAILABLE]

19. 4,966,765, Oct. 30, 1990, Novel coleopteran-active Bacillus
thuringiensis isolate; Jewel Payne, et al., 424/93L; 435/252.1,
252.5, 832; 530/350, 825 [IMAGE AVAILABLE]

20. 4,910,016, Mar. 20, 1990, Novel Bacillus thuringiensis isolate;
Frank H. Gaertner, et al., 424/93L, 195.1, DIG.8; 435/252.5, 832

21. 4,902,507, Feb. 20, 1990, Toxic strains of the bacterium Bacillus
thuringiensis for control of the bertha armyworm Mamestra configurata;
Oswald N. Morris, et al., 424/93L, 88, 92; 435/252.31

22. 4,889,918, Dec. 26, 1989, Protein toxin from bacillus thuringiensis
which is toxic to coleoptera; Aloisius Krieg, et al., 530/350; 424/405;
435/69.1, 71.3, 832; 514/2

23. 4,853,332, Aug. 1, 1989, Structural genes, plasmids and transformed
cells for producing cysteine depleted muteins of biologically active
proteins; David F. Mark, et al., 435/252.33, 69.52, 172.3, 252.1,
320.1; 536/17; 930/141, 142

24. 4,803,165, Feb. 7, 1989, Nif promoter of fast-growing rhizobium
saponicum; Edward R. Appelbaum, 435/172.3, 69.1, 252.2, 252.33,
320.1; 536/27; 935/29, 30, 41, 56, 64, 67, 72

25. 4,797,276, Jan. 10, 1989, Cotton boll weevil, alfalfa weevil, and
corn rootworm via contact with a strain of bacillus thuringiensis;
Corinna Herrnstadt, et al., 424/84, 93L; 435/71.3, 832

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05 AUG 92 12:40:05 U.S. Patent & Trademark Office P0007

26. 4,771,002, Sep. 13, 1988, Transcription in plants and bacteria;
Stanton B. Gelvin, 435/172.3, 252.2, 252.33, 320.1; 935/30, 35,
56, 72

27. 4,766,203, Aug. 23, 1988, New strain of Bacillus, a toxin derived
thereof and a composition for combating Coleoptera; Aloisius Krieg, et
al., 530/370; 424/93L; 435/832; 514/2; 530/825

28. 4,754,372, Aug. 16, 1988, Compositions containing bacillus
thuringiensis toxin toxic to beetles of the order coleoptera, and uses
thereof; Corinna Herrnstadt, et al., 424/93L, 84; 435/832; 514/2

29. 4,737,462, Apr. 12, 1988, Structural genes, plasmids and transformed
cells for producing cysteine depleted muteins of interferon-beta.; David
F. Mark, et al., 435/252.33, 240.1, 240.2, 240.4, 243,
252.31, 252.34, 320.1; 536/27; 930/142, DIG.530

30. 4,717,653, Jan. 5, 1988, Method for identifying and characterizing
organisms; John A. Webster, Jr., 435/5, 6, 35, 39, 172.3,
803; 436/501; 935/78 [IMAGE AVAILABLE]

31. 4,695,485, Sep. 22, 1987, Cellular encapsulation of pesticides
produced by expression of heterologous genes; Andrew C. Barnes, et al.,

424/930; 47/58; 435/69.1, 172.3, 252.3, 252.31, 252.33,
252.34, 254, 255, 256, 260, 317.1
=> c 14 ad

US PAT NO: 5,004,863 [IMAGE AVAILABLE] L4: 14 of 31
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US PAT NO: 5,004,863 [IMAGE AVAILABLE] L4: 14 of 31

ABSTRACT:

A method is disclosed to achieve genetic transformation of cotton plants and lines. Immature cotton tissues are genetically transformed in vitro, by Agrobacterium-mediated genetic transformation. The resultant cotton tissues are subjected to a selection agent or agents to screen for transformants. The transformed cultures are then induced to commence somatic embryogenesis. One possible regime for regenerating such somatic embryos into whole cotton plants is disclosed.

=> d his

(FILE 'USPAT' ENTERED AT 12:33:42 ON 05 AUG 92)

L1 0 S BACILLUS THURINGIENSIS AND PLANT#/CLMS
L2 319 S BACILLUS THURINGIENSIS
L3 106 S L2 AND PLANT#/CLM
L4 31 S L3 AND 435/CLAS

=> s 12 and (transform? or transgenic)(w)plant#

126336 TRANSFORM?

57 TRANSGENIC

100903 PLANT#

76 (TRANSFORM? OR TRANSGENIC)(W)PLANT#

L5 4 L2 AND (TRANSFORM? OR TRANSGENIC)(W)PLANT#

=> d 1-4

1. 5,045,460, Sep. 3, 1991, DNA sequence encoding metalloprotease inhibitor protein; Belinda M. Martineau, et al.,
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05 AUG 92 12:43:01 U.S. Patent & Trademark Office P0009
435/172.3, 317.1; 536/27; 935/30, 67 [IMAGE AVAILABLE]

2. 5,015,580, May 14, 1991, Particle-mediated transformation of soybean plants and lines; Paul Christou, et al., 435/172.3, 172.1, 240.45, 240.47, 240.48, 240.5, 317.1, 320.1; 800/205, DIG.26; 935/30, 52, 53, 67, 85 [IMAGE AVAILABLE]

3. 5,004,863, Apr. 2, 1991, Genetic engineering of cotton plants and lines; Paul F. Umbeck, 800/205; 435/172.3; 800/200, 255, DIG.27, DIG.63; 935/67 [IMAGE AVAILABLE]

4. 4,771,002, Sep. 13, 1988, Transcription in plants and bacteria; Stanton B. Geivin, 435/172.3, 252.2, 252.33, 320.1; 935/30, 35, 56, 72
=> set high off

SET COMMAND COMPLETED

=> s (transgenic or transform?)(w)plant#

57 TRANSGENIC

126336 TRANSFORM?

100903 PLANT#

L6 76 (TRANSGENIC OR TRANSFORM?)(W)PLANT#

=> set high on
SET COMMAND COMPLETED
=> s 12 and 16

L7 4 L2 AND L6

=> d kwic

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U.S. Patent & Trademark Office

P0010

US PAT NO: 5,045,460 [IMAGE AVAILABLE]

L7: 1 of 4

DETDESC:

DETD(5)

MCPI . . . amino peptidase inhibitors, and carboxypeptidase inhibitors having different specificity than the MCPI proteinase. Toxins, such as the crystal protein of *Bacillus thuringiensis* (Bt) have been expressed in plants and have shown insecticidal activity (See, European Patent Application 0193259).

=> d 2-4 kwic

US PAT NO: 5,015,580 [IMAGE AVAILABLE]

L7: 2 of 4

DETDESC:

DETD(42)

The . . . the alfalfa mosaic virus (AMV) coat protein mRNA 5' untranslated region, a DNA fragment encoding an amino-terminal portion of the *Bacillus thuringiensis* delta-endotoxin, and a fragment encoding the polyadenylation region of the nopaline synthase gene from *Agrobacterium tumefaciens* strain A208.

US PAT NO: 5,004,863 [IMAGE AVAILABLE]

L7: 3 of 4

DETDESC:

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U.S. Patent & Trademark Office

P0011

US PAT NO: 5,004,863 [IMAGE AVAILABLE]

L7: 3 of 4

DETD(4)

The . . . be any foreign gene selected to achieve a useful result if expressed in cotton plants. For example, expression of the *Bacillus thuringiensis* crystal protein toxin in the cells of cotton plants would make those cells toxic if ingested by *Lepidoptera* insects, thus. . .

US PAT NO: 4,771,002

L7: 4 of 4

SUMMARY:

BSUM(55)

The . . . anaerobic conditions (e.g. water-logging), drought, or osmotic stress; improved resistance or tolerance to insect (e.g.

insecticidal toxins such as the *Bacillus thuringiensis* crystal protein), arachnid, nematode, or epiphyte pests and fungal, bacterial, or viral diseases; the production of enzymes or secondary metabolites.

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